



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 10  
1200 Sixth Avenue  
Seattle, WA 98101

Reply To  
Attn Of: OCE-082

**MEMORANDUM**

SUBJECT: Final Work Product from the National UIC Technical  
Workgroup: Annular Injection of Drilling Wastes into  
Production Wells

FROM: Thor Cutler, Workgroup Chair *Thor Cutler*  
Kurt Hildebrandt, Workgroup Co-Chair *Kurt Hildebrandt*

THRU: Ms. Joan Harrigan-Farrelly, Chief  
Drinking Water Prevention Branch (4606M)

TO: Mr. Steven F. Heare, Director  
Drinking Water Water Protection Division (4606M)

**Ref: National UIC Technical Workgroup**

The national UIC technical workgroup (NTW) is pleased to  
submit the attached work product entitled:

*Is annular disposal of RCRA exempt wastes into oil and gas  
exploration and production (E&P) wells within the regulatory  
scope of the Underground Injection Control (UIC) program?  
(in both Word and Wordperfect format)*

This work product addresses the underground injection of  
drilling wastes into the casing annulus of exploration and  
production (E&P) wells and completes an assignment made to the  
NTW on April 15, 2002, from the Director of the Drinking Water  
Protection Division.

This work product is unique in that it is the first NTW  
product that has been developed with participation of state  
representatives who had been added to the NTW just prior to  
this assignment. Additionally, while the NTW as a whole  
reviewed and contributed to the documents development, a

considerable amount to time was put in by both the regional and state leads to present a product that meets the goals and objectives of the NTW and the charge of program management.

If you have any questions about this work product, please feel free to contact either Mike Frazier in Region 6 at (214) 665-7236, or Tom Maunder of Alaska's Oil and Gas Conservation Commission at (907) 793-1250. You may also contact NTW chair: Thor Cutler in Region 10 at (206) 553-1673 or Co-Chair: Kurt Hildebrandt in Region 7 at (913) 551-7413 if you have any questions about the NTW.

Attachment

cc: Bruce Kobelski (4606M)  
Robert E. Smith (4104M)

UIC NATIONAL TECHNICAL WORKGROUP  
PRODUCT COVER SHEET

ISSUE # 7

1. Title:

**“Annular Disposal of RCRA exempt wastes into oil and gas exploration and production (E&P) wells within the regulatory scope of the Underground Injection Control (UIC) program.**

2. Date of Finalization:

**August 3, 2004** (Amended June 23, 2005 to remove erroneous citation regarding annular disposal in Nevada. This change did not affect the workgroup’s final recommendation.)

3. Background/Brief Reason for its Need:

**Summarize available information about annular disposal of drilling wastes into production wells, and provide specific suggestions to EPA HQ concerning the need for national consistency on the issue.**

4. Author(s):

**Mike Frazier, USEPA Region 6  
Tom Maunder, Alaska Oil and Gas Commission**

5. Background Information Location (where the supporting documents are):

**Supporting documentation rests in EPA Region 6. Contact Mike Frazier at (214) 665-7236**

**Is annular disposal of RCRA exempt wastes into oil and gas exploration and production (E&P) wells within the regulatory scope of the Underground Injection Control (UIC) program?**

**BACKGROUND:** Annular disposal is injection of fluids underground between well casings or between the outermost well casing that protects underground sources of drinking water (USDWs) and the well bore. Federal UIC regulations only prohibit the latter form of annular injection [see 40 CFR 144.28(f) (rule authorized Class I, II & III wells), 146.13(a)(2) (new Class I non-haz wells), 146.23(a)(2) (new Class II wells), 146.33(a)(2) (new Class III wells), and 146.67(b) (new Class I haz wells)]. All other forms of annular injection are not prohibited. Disposal of produced brine into the annulus of E&P wells is typically authorized through applicable UIC primacy programs. In fact, Section 1428 of the Safe Drinking Water Act (SDWA) defines annular injection as “the reinjection of brines associated with the production of oil or gas between the production and surface casings of a conventional oil or gas producing well.” In authorizing the Wellhead Protection Program, SDWA §1428 requires states with over 2,500 active annular disposal wells to certify,

**“... that a State program exists and is being adequately enforced that provides protection from contaminants which may have any adverse effect on the health of persons and which are associated with the annular injection or surface disposal of brines associated with oil and gas production.”**

However, some states authorize disposal of drilling muds and cuttings into the annulus of E&P wells through UIC regulations while others authorize the activity outside the scope of State UIC primacy. EPA’s current policy on disposal of drilling muds is limited to a November 24, 1987, policy memo from the Office of Water to EPA Region 10 stating:

**“The discussions we have held with you and your staff on the coverage of the UIC program have dealt with disposal of drilling muds used in the construction of oil and gas wells or the drilling of exploratory holes, which are one-time operations. The position we have taken is that disposal of such drilling muds whether in a dry hole or in the annulus of a producing well is not covered by the UIC regulations. This decision is not affected by whether the muds are produced in drilling of one or several wells or whether they are placed into the dry hole or the annulus all at once or over a period of time.” [Emphasis added.]**

Since that time, EPA has approved changes in State UIC Class II programs that both exclude and include annular disposal of such drilling fluids under UIC regulation. The background technical memo dated November 8, 1987, from Region 10 to the Office of Water on which EPA Headquarters based the 1987 policy determination appears flawed by

incomplete and erroneous interpretation of the UIC regulatory preamble language at 44 FR 22745 and 23754, April 20, 1979:

November 8, 1987, Memo: "In 44 F.R. 22745 "Other types of annual (sic) injection would be permissible, however, if it is determined that they would not result in the contamination of ground water.""

*Actual Preamble Language: "Other types of annual injection would be permissible, however, if it is determined on a case by case basis that they would not result in the contamination of ground water." [Emphasis added.] Note: annual injection should read annular injection.*

November 8, 1987, Memo: "Furthermore, 44 F.R. 23754 discusses the "principal function of the well" and concludes that injection into exploratory wells (regardless of impact to a USDW) is not included under the UIC regulations."

*Actual Preamble Language: "One commenter suggested that the subsurface disposal of mill wastes (tailings) be specifically exempted from the regulations. Conversely, two suggested that seismic "shot holes," mineral exploration test wells, and cathodic protection wells be included. EPA is guided by the intent of Congress, as stated in Section 1421(d) of the SDWA, that "underground injection means the subsurface emplacement of fluids by well injection." Therefore, only wells whose primary function is the emplacement of fluids would be subject to these regulations. Consequently, the subsurface disposal of mill tailings has been retained in the regulations. The other three categories are not included." [Emphasis added.]*

Furthermore, a review of the "principal function of the well" language in the UIC preambles reveals a subtle change from "a principal function" at 41 FR 36731, August 31, 1976, to "the principal function" in 40 CFR 144.1(g)(1)(ii) promulgated at 48 FR 14190, April 1, 1983. In addition, some State UIC programs argue that annular disposal of drilling fluids into the annulus of production wells is an integral part of constructing an oil and gas well, and therefore, specifically exempt from UIC regulation as stated at 41 FR 36732, August 31, 1976.

A 2003 Argonne Laboratory publication entitled "A Compendium of Regulatory Requirements Governing Underground Injection of Drilling Wastes" (DOE Contract No. W31-109-Eng-38) identifies annular disposal as a type of fracture slurry injection (page 5): "One type of injection discussed in this compendium is annular disposal. While there are similarities with the other injection methods, there are also some very distinct differences that should be recognized. Annular injection is addressed by some states independent of the UIC program as an operation incidental to the drilling of a well and is therefore not a disposal operation subject to UIC." [Emphasis added.]

**CONCERN:** Documented cases of drilling wastes injected into the annulus of production wells flowing to surface prove this activity is a threat to USDWs. Some State UIC Primacy and EPA DI UIC programs allow annular disposal of drilling fluids and other RCRA exempt wastes into production wells, while some State oil and gas regulatory programs authorize annular disposal of drilling wastes outside the scope of UIC. Inconsistent EPA oversight on this issue creates regulatory confusion and inadequate protection of USDWs.

**SUGGESTED ACTION:** The UIC National Technical Workgroup (NTW) recommends that EPA Headquarters review this issue and develop a new policy statement or technical guidance that clarifies SDWA regulation of annular disposal of drilling wastes into the annulus of E&P wells.

**RATIONALE:** EPA's July 6, 1988, "Regulatory Determination for Oil and Gas and Geothermal Exploration, Development and Production Wastes" at 53 FR 25446, 25449, identifies annular disposal as a "gap" between RCRA and SDWA regulation. The historical gap between RCRA and UIC regulation of annular disposal of drilling fluids has fostered varying degrees of regulation by both State and DI programs. In recent years, the activity resulted in wastes penetrating USDWs and even flows to surface. The small number of documented cases of ground water contamination or flows to surface resulting from annular disposal of drilling wastes represent only those reported to EPA by State UIC primacy programs. In most cases, annular disposal of drilling fluids requires fracturing the injection zone that is typically 500 feet or less from the base of a USDW when injected between the surface casing protecting USDWs and the production casing. The Argonne Lab study mentioned above appears comprehensive in surveying how states authorize annular disposal of drilling wastes. Table 1 of the Argonne study shows slurry injection activities in 30 states, with 20 allowing annular disposal of drilling wastes. Of those 20, 50% (10) appear to regulate the activity under UIC authorization and only 4 of the 10 regulate the activity through State UIC programs (the other 6 are EPA DI programs). The other 50% regulate annular disposal of drilling wastes outside the scope of UIC through either general or specific state regulations. A national UIC regulatory guidance appears warranted to address the ambiguity surrounding the implied UIC "exemption" of annular injection of drilling wastes from SDWA/UIC regulation and the varying regulation and authorities by both state and federal agencies.

EPA should move toward national consistency in regulating annular disposal by applicable State or EPA UIC programs. In cases where authorization is outside the applicable UIC program, a protective determination may be inadequate to protect USDWs. Adequate public participation in the authorization process also appears questionable. In order to meet the SDWA mandate to protect USDWs, a clear and fair policy on this disposal practice will allow EPA to properly oversee both DI and State program authorizations. EPA and State UIC primacy programs should work together to modify applicable State UIC Primacy programs to appropriately reflect any new policy/guidance.

**PITFALLS:** A proactive guidance may create controversy within the regulated community and applicable State UIC programs, and therefore, the Interstate Oil and Gas Compact Commission (IOGCC) and the Ground Water Protection Council (GWPC) should be active participants in the process. State members and some EPA members of the UIC NTW express concern about the political ramifications of any policy changes on State UIC programs, particularly any policy that would require any revisions to State UIC program regulations or statutory authority. Without appropriate national policy that resolves this real threat to USDWs, third parties could petition EPA to withdraw UIC primacy from those State UIC programs that do not adequately regulate annular injection of drilling wastes.